Agreement INGV-DPC 2007-2009

Project S4: ITALIAN STRONG MOTION DATA BASE

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http://esse4.mi.ingv.it

Deliverable # D3

Definition of the standard format to prepare descriptive monographs of ITACA stations

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RAN

Rete Accelerometrica Nazionale

(National Accelerometric Network)

Recording Station

Station Code

	Day	Month	Year
First compilation			
Last update			

General Information

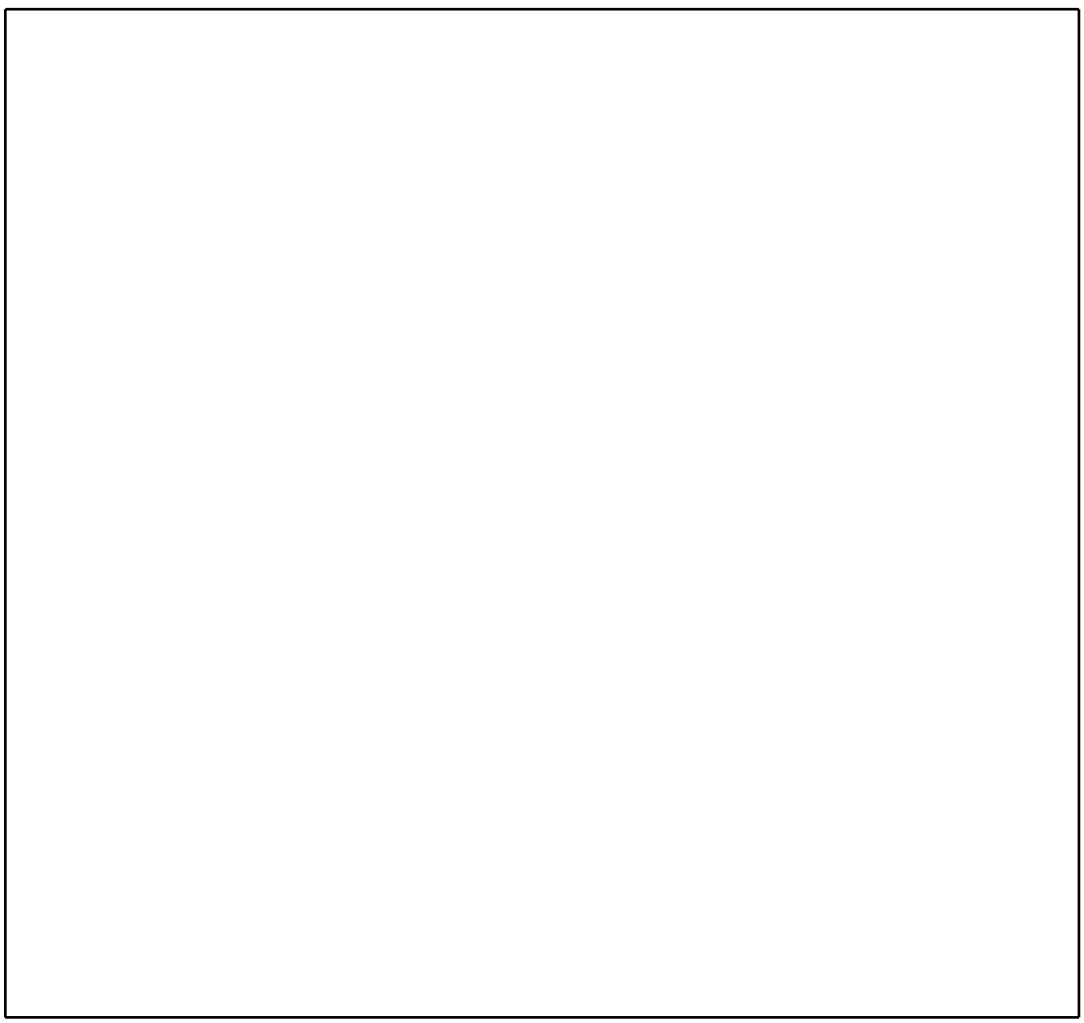
Station photograph	
Code	
Owner	
Type of station	
Activation date	
Removal date	
Instrument type	
Instrument model	
Housing	
Notes	

Geographical Information (1/2)

Location

Region	
Province	
City	
Place / Address	
ISTAT Code	
Notes	

Location map
(Italy and Region)



Geographical Information (2/2)

Coordinates

	Latitude	Longitude
Geographic (WGS84)		
Elevation (m a.s.l.)		

Cartography

	Scale	Code
Topographic map (I.G.M.I.)		
	Scale	**Element number**
Regional technical map (C.T.R.)		

I.G.M.I. or C.T.R. map

Geomorphology

Site morphology

Plain	Valley (centre)	Valley (edge)	Alluvial fan
Saddle	Slope	Edge of scarp	Ridge

Landslides

☐ Not present

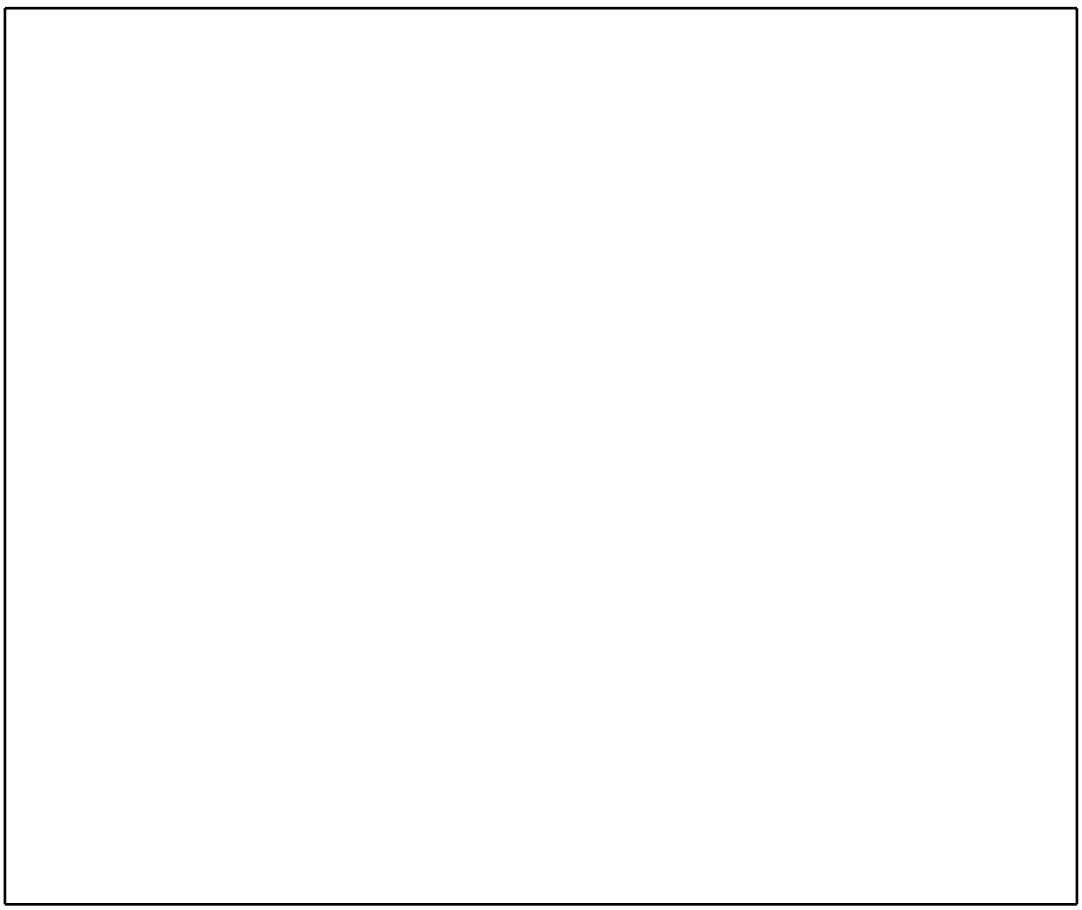
☐ Present

☐ Active or quiescent

☐ Inactive or stabilized

Distance (m)

I.F.F.I. map



Notes

Geology

Cartography

	Scale	Sheet number	Sheet name
Geological map			

Legend

Geological cross section

Fault proximity

certain ☐

supposed ☐

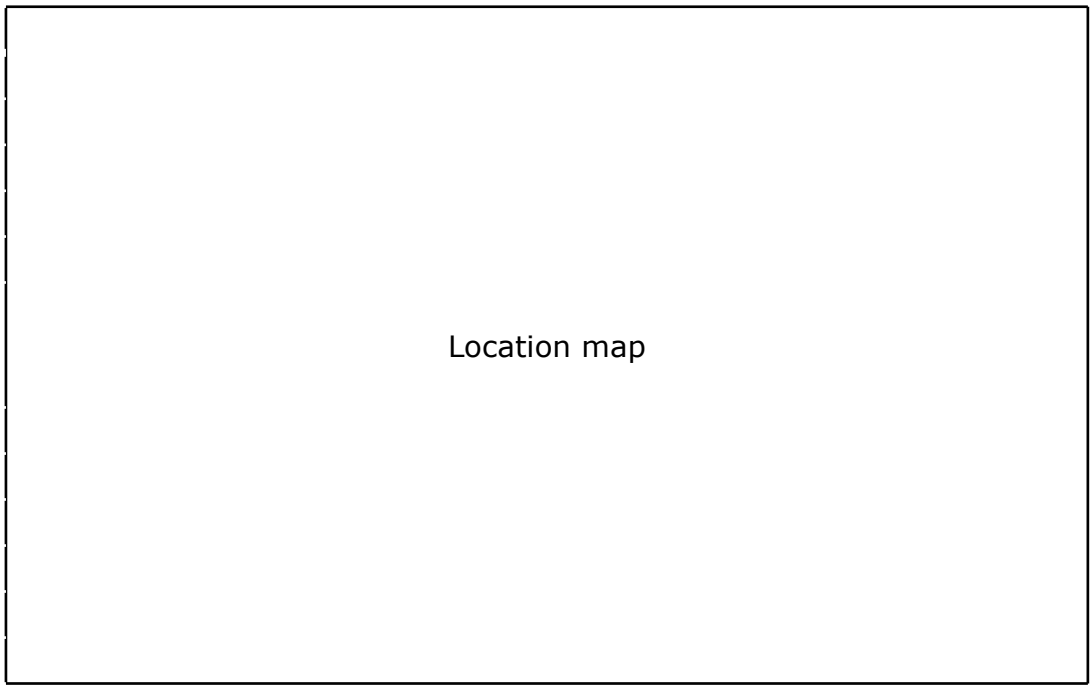
(see notes for further information)

Notes

Geomechanical information (1/2)

Location of geomechanical station

♦ Geomechanical station



Geomechanical survey *(Rock mass conditions and parameters)*

Stations						
Code	Lithotype	Jv (Joint/m^3)	Ib (cm)	RQD Computed (%)	ISRM 1981 classification	RMR 1989 classification

Notes

Geomechanical information (2 / 2)

Lithotechnical map

Scale

Legend

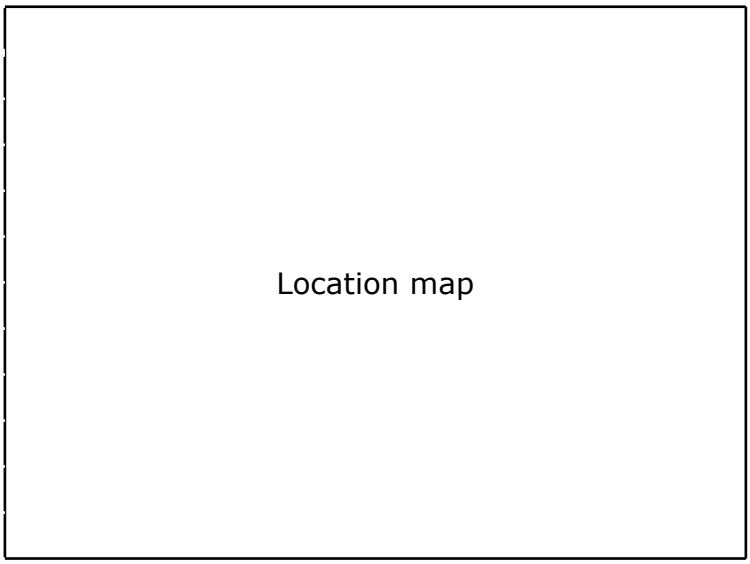
Lithotechnical cross section

Notes

Geotechnical, Geomechanical & Geophysical Information (1/8)

Test summary and location

☐	⊗	Borehole
☐	P	Piezometer
☐	▲	Penetration tests (SPT, CPT)
☐	⊕	Down-Hole, Cross-Hole (DH, CH)
☐	∇-∇	Seismic refraction/reflection
☐	O	SASW, MASW, NASW, ESAC, FK
☐	◊-◊	Geoelectric
☐	∇	Schmidt Hammer Test
☐	▼	Point Load Test
☐	⓿	Dilatometer
☐	▬	Flat / Hydraulic Jack Test
☐		Lab tests



Stratigraphic profile

Depth (m), #Layer, Piezometric level, Samples, Layer description

In situ Tests: *Piezometric measurements*

Table

Chart

In situ Tests: *Penetration Test (SPT, CPT)*

Chart (SPT)

Chart (CPT)

In situ Tests: *Down-Hole, Cross-Hole, SASW, MASW, NASW, ESAC, FK*

Table 1

Chart 1
Depth (m) - Vs

Table 2

Chart 2
Depth (m) - Vs

In situ Tests: *Refraction/Reflection section – Geoelectric section*

Refraction/Reflection section

Geoelectric section

Laboratory Tests: *physical properties*

Borehole	Sample	Depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	w (%)	γ_s (kN/m³)	γ (kN/m³)	w_L (%)	I_P (%)	I_C	A	e

Chart
depth (m) - γ (kN/m³)

Chart
Depth (m) - wP, w, wL (%)

Chart
Depth (m) – I_C

Chart
Depth (m) - e

Plasticity chart

Granulometry chart

Laboratory Tests: *Direct shear/Triaxial tests*

Table

Chart

Table

Chart

Legend
DS = *Direct shear*
CIU =*Triaxial-Consolidated Undrained*
CID =*Triaxial-Consolidated Drained*
UU =*Traxial-Unconsolidated Undrained*

Note

Average values of mechanical parameters

Litotype	c' (kPa)	φ' (°)	c_u (kPa)

Laboratory Tests: *Resonant Column (RC)*

Borehole / Sample / Depth (m)													
	γ (%)												
	G/G_0												
	D (%)												
	γ (%)												
	G/G_0												
	D (%)												
	γ (%)												
	G/G_0												
	D (%)												

Chart
G/G_0 - γ (%)

Chart
D (%) - γ (%)

Laboratory Tests: *Cyclic Triaxial (CTX)*

Borehole / Sample	p'_c (MPa)											
		ε (%)											
		E (MPa)											
		ε (%)											
		E (MPa)											
		ε (%)											
		E (MPa)											

Chart
E (MPa) - ε (%)

Microtremor H/V spectral ratio

∅ Spectral Ratio (H/V)

Location map

Table

Chart

$f_{0\ (mt)}$ (Hz)

Date of measurements	Day	Month	Year

Earthquake H/V spectral ratio

Table

Chart

$f_{0\ (eq)}$ (Hz)

Number of selected records from ITACA

Site classification (EC8 – NTC2008)

Lithostratigraphic classification

Estimated

Method[1]	Soil class[2]	Notes

1 Legend

GEO	Geological data
EC	Empirical correlation
HV	H/V spectral ratio

Based on in-situ measurements

Method[3]	V_{s30} (m/s)	Soil class[2]

2 Legend

A	Rock or other rock-like geological formation, including at most 5 m of weaker material at the surface (V_{s30}>800 m/s).
B	Deposits of very dense sand, gravel, or very stiff clay, at least several tens of m in thickness, characterized by a gradual increase of mechanical properties with depth (V_{s30}=360–800 m/s).
C	Deep deposits of dense or medium dense sand, gravel or stiff clay with thickness from several tens to many hundreds of m (V_{s30}=180–360 m/s).
D	Deposits of loose-to-medium cohesionless soil (with or without some soft cohesive layers), or of predominantly soft-to-firm cohesive soil (V_{s30}<180 m/s).
E	A soil profile consisting of a surface alluvium layer with V_s values of type C or D and thickness varying between about 5 m and 20 m, underlain by stiffer material with V_s>800 m/s.

3 Legend

CH	Cross-Hole
DH	Down-Hole
ES	ESAC
FK	FK
MW	MASW
NW	NASW
SH	SH-Refraction
SW	SASW
___	_____

Topography classification

Topography category[4]

4 Legend

T1	Flat surface, isolated slopes and cliffs with average slope angle i≤15°.
T2	Slopes with average slope angle i>15°.
T3	Ridges with crest width significantly less than the base width and average slope angle 15°≤i≤30°.
T4	Ridges with crest width significantly less than the base width and average slope angle i>30°.

Synthesis of information

Information relevant to site classification		Notes
V_{s30} (m/s)		
Average N_{SPT} to 30m		
Average c_U to 30m (kPa)		
Site class (EC8 – NTC2008)		
Topography category (EC8 – NTC2008)		

Geological, geomorphological and geomechanical information	
Lithology	
Morphology	
Rock mass	

Other information relevant to seismic site response		
Depth to bedrock (m)		
Average V_s to bedrock (m/s)		
f_0 from H/V microtremors (Hz)		
f_0 from H/V earthquakes (Hz)		

Distinctive features of site response		

References

Geomorphology & Geology

Geotechnical, Geomechanical & Geophysical Information

Research papers

Enclosures

List

N.	Description